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EXAMINER

BAREFORD, KATHERINE A

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1762

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,490

Applicant(s)

STEENKISTE ET AL.

Examiner

Katherine A. Bareford

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

The amendment of April 28, 2005 has been received and entered.

Election/Restrictions

1. Applicant's election of Group I, claims 1-18 in the reply filed on April 28, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claim 19 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 28, 2005.

Information Disclosure Statement

3. In the IDS filed April 25, 2005, the references to US 6422039 and US 5242101 have been crossed out as the information given in regard to those references is incorrect. US 6422039 actually issued July 23, 2002 and is to Bamminger. US 5242101 actually issued Sept. 7, 1993 and is to Kuchelmeister et al. The reference to McCune et al, An Exploration of the Cold Gas-Dynamic Spray Method. . . has been crossed out as no reference was supplied.

Specification

4. The objection to the disclosure because of informalities at paragraph [0001] is withdrawn due to applicant's amendments of April 28, 2005 clarifying the continuity and status of the prior applications.

Claim Objections

5. The objections to claims 1, 6, 16 and 17 because of informalities is withdrawn due to applicant's amendments of April 28, 2005 to clarify the claims.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. The rejection of claims 1-7 and 9-18 under 35 U.S.C. 103(a) as being unpatentable over Longo et al (US 3723165) in view of Browning (US 4416421) is withdrawn due to applicant's amendments to provide that the first particles are not thermally softened.

9. Claims 1-7 and 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bird (US 4938991) in view of Browning (US 4416421).

Bird teaches a method of coating a substrate. Column 2, lines 30-35. The steps include providing at least a first population of particles (the heavy metal refractory carbide) and a second population of particles (the metal alloy) to be sprayed. Column 3, lines 1-15 and 50-68. A conventional flame spray device is provided to thermally spray the particles on to a substrate. Column 3, lines 5-10 and column 4, lines 10-20. The first and second populations are provided as a mixture and injected into the spray nozzle of the thermal spray gun at the same time to spray the particles. Column 3, lines 1-15 and column 4, lines 10-20. The temperature of the gas in the nozzle is such as to be insufficient to heat the first population of particles (the heavy metal refractory carbide) to a temperature at or above their melting temperature in the nozzle. Column 3, lines 5-10. This heating temperature would be below the thermal softening point, give the material provided and the heating temperature (column 3, lines 50-60 and column 4, lines 15-25—cobalt and tungsten carbide melt well above 1850-2100 degrees F). The velocity of the particles, however, is sufficient to result in adherence of the particles on a substrate opposite the nozzle, in combination with the spraying of the second, metal,

particles. Column 3, lines 1-20. The temperature of the gas in the nozzle is selected to be sufficient to heat the second population of particles (the metal alloy) to a temperature above their melting point in the nozzle, thereby melting the second population of particles. Column 3, lines 1-15. The molten particles are accelerated to a velocity sufficient to result in adherence of the particles to the substrate. Column 3, lines 1-15. This forms a coating on the substrate that is a combination of the first and second populations of particles. Column 3, lines 1-20.

vb Claim 2: the diameter of the particles can be in the range of -325 ^emesh for the carbide (approx. 45 microns) and -200 mesh for the metal alloy (approx. 75 microns). Column 3, lines 60-68.

Claim 4: the particles can differ from one another in size and material composition. Column 3, lines 50-68.

Claims 6 and 10-12: the temperature of the gas is such that the metal alloy melts and the carbide does not. Column 4, lines 1-25.

Claim 13: the substrate can be metal. Column 2, lines 30-35.

Claim 14: the particles can be a metal alloy and a ceramic mixture, giving a first population of ceramic (carbide) and a second population of metal alloy. Column 3, lines 1-15.

Claim 18: a mixture of the first and second populations of particles is supplied to the spray gun. Column 3, lines 1-15.

Bird teaches all the features of these claims except (1) the converging-diverging gun features (claim 1), (2) the specific gas/heating temperatures (claims 6, 10-12), (3) the injection point (claim 7), (4) the particle speed (claim 9), (5) the tube diameter (claim 15), (6) the nozzle diverging length (claim 16) and (7) the nozzle throat diameter (claim 17), (8) the precise particle size (claims 2-3) and (9) the gas of the spray gun (claim 5).

Browning teaches a flame spray system. Column 1, lines 10-20. In the system, a nozzle is provided having a throat located between a converging region and diverging region. Figure 1 and column 4, lines 25-45. A flow of gas is directed through the nozzle. Figure 1 and column 4, lines 25-45. The gas is maintained at a select temperature. Column 2, lines 20-35 (the continuous combustion provides controlled temperature based on the oxy-fuel mix used). The particles to be sprayed are injected into the nozzle and entrained in the flow of gas. Figure 1 and column 4, lines 25-45. A supersonic velocity of particles is achieved. Column 5, lines 15-30. The injection point is into the converging region of the nozzle prior to the throat. Figure 1 and column 4, lines 25-45. The particle speed can be 2000 ft/sec (approximately 610 m/sec). Column 5, lines 15-30. The nozzle length can be 4 inches (approximately 100 mm). Column 4, lines 45-55. The gas can include oxygen/air. Column 3, lines 50-60. The system is adjusted so that the length of the nozzle is at least five times that of the minimum diameter of the nozzle bore. Column 2, lines 40-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bird to use the flame spray gun of Browning with an

expectation of providing a desirable coating product, because Bird teaches a method of spraying mixtures of particles using a conventional flame spray system and Browning teaches a desirable flame spray system for spraying particles. Using the system of Browning provides the claimed converging-diverging gun features, the injection point, and the particle speed and use of air to the spray gun. As to the claimed specific gas/heating temperatures, Bird teaches that they must be such so as to provide the claimed non-melting/melting results and provides exemplary temperatures, and one of ordinary skill in the art would perform routine experimentation to optimize the specific temperatures to be used based on the specific materials to be sprayed. As to the claimed tube diameters, nozzle lengths and throat diameters, Browning indicates that the system is to be adjusted so that the length of the nozzle is at least five times that of the minimum diameter of the nozzle bore, and as a result, one of ordinary skill in the art would perform routine experimentation to optimize the specific gun measurements based on the size of gun desired and material being sprayed. As to the precise particle sizes used, Bird provides a single example of sizes that are in the general area of that claimed by applicant, and one of ordinary skill in the art would perform routine experimentation to optimize the particle size for the particular article to be coated and the particular materials used, such that the desired melting/non-melting occurs and the encapsulated particles occurs.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bird in view of Browning as applied to claims 1-7 and 9-18 above, and further in view of Browning (US 5531590) (hereinafter Browning '590).

Bird in view of Browning teaches all the features of these claims except injecting the particles into the diverging region of the nozzle after the throat.

However, Browning '590 teaches that when using a supersonic flame jet device, with a diverging region of the nozzle after a relatively narrow passage to introduce fuel and oxygen, it is known to inject the particles to be sprayed into the diverging region of the nozzle. See figure 2a and column 2, lines 5-30 and column 2, line 60 through column 3, line 15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bird in view of Browning to inject the particles into the diverging region as suggested by Browning '590 with an expectation of providing a desirable coating product, because Bird in view of Browning teaches a method of spraying mixtures of particles using a converging-diverging flame spray system and Browning '590 teaches a desirable flame spray system with a diverging region can be provided with a particle injection into the diverging region.

Response to Arguments

11. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Due to applicant's amendment to claim 1 to require that the first particles are not thermally heat softened, the Examiner has used the reference to Bird that was provided with the last Office Action (paragraph 12).

Oath/Declaration

12. The declaration provided April 28, 2005 is acceptable.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER